

THE CLAIMS

1. A light-weight, portable, cleaning system for providing efficient cleaning of elongated tubes or conduits, said system comprising:
 - A. an elongated, continuous shaft/cable;
 - B. a brush mounted to a first end of the elongated shaft/cable;
 - C. a motor constructed for providing a rotational output, said rotational output being drivingly engaged with a plurality of gear members and a coupling, said coupling connected to the elongated shaft/cable for continuously rotating said shaft/cable;
 - D. a plurality of gear members rotationally mounted in juxtaposed, side to side relationship and cooperating to define a travel path for receiving a length of the shaft/cable and longitudinally driving the shaft/cable in either a forward direction or a rearward direction; and
 - E. a pinion gear drivingly engaged with the rotational output of the motor and interconnected with the plurality of gear members for imparting rotational movement to the gear members in order to achieve the desired axial movement of the shaft/cable;

whereby controlled axial movement and rotational movement of the shaft/cable is attained in an efficient and controlled manner.

2. The cleaning system defined in Claim 1, wherein the plurality of gear members are further defined as comprising five separate and independent gear members, with three of said gear members being aligned in a first row and two of said gear members being aligned in a second, adjacent row.
3. The cleaning system defined in Claim 2, wherein each of the gear members mounted in said second row are interconnected with the gear members mounted in the first row for rotationally driving at least two of said gear members.
4. The cleaning system defined in Claim 3, wherein the pinion gear is further defined as being mounted in driving engagement with the two gear members mounted in said second row, whereby the rotational movement of the pinion gear imparts the driving force for rotating all of the gear members.

5. The cleaning system defined in Claim 1, wherein each gear member is further defined as being rotationally mounted on a support shaft with each of said support shafts being mounted to a support plate in juxtaposed, spaced, aligned relationship with each other.

6. The cleaning system defined in Claim 5, wherein each gear member is further defined as comprising a concave outer surface portion constructed for receiving and controllably advancing the shaft/cable mounted therewith to provide the desired axial movement of said shaft/cable.

7. The cleaning system defined in Claim 6, wherein each of said gear members is further defined as comprising ball bearing assemblies mounted in receiving zones formed therein, with said ball bearing assemblies been constructed for mounting on said support shaft, thereby assuring continuous, trouble-free, balanced rotation of each of said gear members.

8. The cleaning system defined in Claim 7, wherein each of said gear members is further defined as comprising a cover plate securely affixed to the terminating end thereof for preventing unwanted damaging material or debris from entering the interior of the gear member.

9. The cleaning system defined in Claim 1, wherein said system further comprises a handle mounted to be second end of the shaft/cable for enabling the operator to position the brush and rotating shaft/cable where desired, said handle further comprising control means for selecting the directional movement of the shaft/cable.

10. The cleaning system defined in Claim 9, wherein said system further comprises a housing constructed for retaining the motor, gear assembly, and associated electronics and enabling the equipment to be easily transported wherever desired.

11. The cleaning system defined in Claim 10, wherein said system further comprises a shaft/cable receiving portal formed in the housing in cooperating alignment with the travel path formed by the gear members for enabling the shaft/cable to move into and out of the housing depending upon the rotational movement of said gear members.

12. The cleaning system defined in Claim 11, wherein said system further comprises a spring biased shaft/cable movement control assembly mounted to the receiving portal formed in the housing and constructed for receiving the shaft/cable as the shaft/cable axially moves relative to the housing and controllably aligning the shaft/cable for movement relative to the receiving portal to prevent binding thereof.

13. The cleaning system defined in Claim 12, wherein said movement control assembly is further defined as comprising a first plate member and a second plate member mounted in juxtaposed, spaced, cooperating alignment with each other, with each of said plate members incorporating a hole positioned in axial alignment with each other for receiving and guiding the shaft/cable.

14. The cleaning system defined in Claim 13, wherein the first plate member is further defined as being mounted directly to said housing with the receiving hole thereof aligned with the portal formed in the housing and the second plate member is movably mounted to the first plate member.

15. The cleaning system defined in Claim 14, wherein said movement control assembly further comprises a plurality of spring members mounted between the first plate member and the second plate member for continuously biasing the second plate member away from the first plate member while enabling the second plate member to be moved towards the first plate member by the axial movement of the shaft/cable, thereby guiding and controlling the entry angle of the shaft/cable into the receiving portal of the housing for preventing binding thereof.

16. The cleaning system defined in Claim 15, wherein said movement control member further comprises a plurality of guideposts extending from one plate member towards the other plate member for controlling the movement of the second plate member towards the first plate member.

17. The cleaning system defined in Claim 1, wherein the rotational output of the motor is further defined as being interconnected with a gear reducing assembly for controllably reducing the rotational speed of the gear members relative to the rotational speed of the shaft/cable, thereby assuring that the rotational speed of the shaft/cable is more rapid than the longitudinal movement speed of the shaft/cable.

18. The cleaning system defined in Claim 17, wherein the rotational speed of the shaft/cable is further defined as being about twice the longitudinal movement speed of the shaft/cable.

19. The cleaning system defined in Claim 18, wherein both the rotational speed of the shaft/cable and the longitudinal movement speed of the shaft/cable are controllable by the user.

20. The cleaning system defined in Claim 1, wherein said system further comprises electronic controls for enabling system start-up to occur in a continuously increasing, power ramp-up manner.